

Fuel Cell Research Center Opens on Campus

By Maureen Keller



Tony Dean, Neal Sullivan and Andrew Herring are three of CSM's fuel cell researchers.

Mines is now at the forefront of fuel cell technology in the region thanks to the opening in May of the Colorado Fuel Cell Center (CFCC) located on campus. Mines was chosen to house the lab, the first of its kind in the state.

About \$3 million is being invested in equipment purchases and in upgrading the laboratory in the general research building, which also houses the Geology Museum and the Center for Space Resources. Funding was provided by the Governor's Office of Energy Management and Conservation (OEMC), the School, the Gas Technology Institute, Versa Power Systems Inc. and the National Renewable Energy Laboratory (NREL).

"As the market for fuel cells starts to grow, the price will come down," predicts Remick. The U.S. Department of Energy is encouraging the study of fuel cell technology with a \$1 billion initiative, FutureGen. By 2015, the U.S. Department of Energy would like to have a 100-megawatt fuel cell running as part of a coal-burning power plant. One of the CFCC partners, Versa Power Systems in Littleton, is participating in FutureGen. But even by next year, Remick says, the fuel cell industry should be producing fuel cells that can power laptops and cell phones.

The CFCC already has projects underway in three fuel-cell research areas. Associate Professor Andy Herring is developing new high performance polymers that will improve the power output and the longevity of fuel cells designed for portable and transportation applications. Professor Tony Dean is studying fuel processing with the goal of making fuel cells compatible with a wide range of alternative and renewable fuels. Professor Robert Kee is studying high temperature fuel cells and cell components to develop new modeling and simulation tools for improving performance and endurance and lowering costs.

Currently 10 graduate and undergraduate students are performing research on a variety of externally funded projects. Eventually, the laboratory will be able to accommodate up to 25 researchers. The CFCC is funded by the governor's OEMC with matching funds from the center's partners. There is hope that within two years, the CFCC could become self-sustaining through research and development contracts and consulting agreements.

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CSM professors and students have been doing fuel cell research for years, but the new campus lab provides a central place for interaction and collaboration. "It's cross-cutting research and involves chemical engineering, mechanical engineering and metallurgy," says Dr. Robert Remick, CFCC director. "The CFCC and all of its partners are thrilled to have this state-of-the-art laboratory where some of the fuel cell industries' top researchers and developers can collaborate on research and share successes." Collaboration could speed up development of the technology.

Fuel cell technology is one of the alternative energy conversion devices being considered to replace, or at least reduce, our use of combustion engines for generating electricity. A fuel cell converts fuel and oxygen into electricity using a chemical reaction, rather than combustion, so emissions are much cleaner. Fuel cells are something like batteries that can run indefinitely so long as they are provided fuel and air. Fuel cells have already been produced and are in use around the world. NASA, for example, has used fuel cells to power spacecraft since the 1960s and more recently, the cities of Chicago and Vancouver have demonstrated that city buses can be powered with fuel cells. But the cost is still prohibitive for most applications.

